

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755110018-2

TATEVSKIY, Y. M.

APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755110018-2"

**"APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001755110018-2**

**APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001755110018-2"**

POZDYSHEV, V.A.; PENTIN, Yu.A.; TATEVSKIY, V.M.

Kinetics of the rotation isomerization reaction, Vest. Mosk. un.  
Ser. mat., mekh., astron., fiz. khim., 12 no.5:221-226 '57.

(MIRA 11:9)

1. Laboratoriya molekulyarnoy spektroskopii Moskovskogo gosudarstvennogo  
universiteta.

(Isomerization)

*TATEVSKIY, V.M.*  
USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-  
chemistry, Catalysis.

B-9

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7221.

Author : V.A. Mal'tsev, A.D. Rusin, V.M. Tatevskiy.

Inst :

Title : To The Question of Spectroscopic Study of Combustion Reaction.

Orig Pub: Zh. fiz. khimii, 1957, 31, No 5, 1175-1176.

Abstract: The changes of the relative concentration of OH radicals in time are shown. These changes were recorded from the absorption spectrum at the explosion of  $H_2 + O_2$  mixture on a rapidly moving film.

Card : 1/1

-20-

TAT ~~EVSK~~ Y, V, N

2

TATEVSKIY, V.M.

PENTIN, Yu.A.; TATEVSKIY, V.M.

Possibility of spectroscopic determination of the difference in energies of rotation isomers of complex molecules [with summary in English]. Zhur.fiz.khim.31 no.8:1830-1838 Ag '57. (MIRA 10:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.  
(Isomers--Spectra) (Molecules--Spectra)

**"APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001755110018-2**

**APPROVED FOR RELEASE: 07/16/2001**

**CIA-RDP86-00513R001755110018-2"**

PA - 2765

AUTHOR: TATEVSKIY, V.M.  
 TITLE: Chemical Structures and Physical and Chemical Properties of Hydrocarbons. New Laws and Calculation Methods. (Khimicheskoye stroeniye i fiziki-khimicheskoye svoystva uglevodorodov. Novyye zakonomernosti i metody rascheta, Russian)  
 PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 4, pp 836 - 838 (U.S.S.R.)  
 Received: 6 / 1957  
 Reviewed: 7 / 1957

ABSTRACT: In the introduction to his paper the author cites some of his earlier publications. Equations are introduced which describe a number of physical and chemical properties of paraffins (alkanes). The same properties of paraffins of higher order are described by the equation

$$p_n^{(m)} = 2P_{12} - 3P_{22} + \Delta^{(m)} + nP_{22} \quad (5)$$

where n denotes the number of C-atoms in the paraffin, while the remaining values of the right part of the equation are constant. The coefficients of the straight line (5) can be determined if the values of P are known for two paraffins (alkanes) of the m-group and the values of P can be computed for all other paraffins of the same group (with different values of n) from this equation. In so far as the values  $P_{12}$  and  $P_{22}$  can be determined from the values of the corresponding physical and chemical properties of normal paraffins (alkanes) and  $\Delta^{(m)}$  - from the value of the same physico-chemical

Card 1/3

Chemical Structures and Physical and Chemical Properties PA - 2765  
of Hydrocarbons. New Laws and Calculation Methods.

property of one of the paraffins of the m-group, data on the properties of normal paraffins and the experimental value of the property P for one single paraffin of the same group can be used for the computation of the property under consideration of all paraffins of the group which was selected. Such methods of computing the physico-chemical properties of paraffins of higher order as have hitherto been known are apparently extended and supplemented to a considerable degree by this equation. For all other classes of hydrocarbons with alkyl radicals the formula

$$P = C + \sum_{i=1}^4 n_{ij} P_{ij} \quad (6)$$

was developed also previously. It can easily be seen that the hydrocarbons with a given core (C - const) can be divided into groups according to the character of the substituting alkyl radicals in such a manner that for every group (e.g. for the m-group) the equation can be transformed in two steps to give the final result

$$P_n^{(m)} = C^{(m)} + \Delta^{(m)} + n P_{22} \quad (9)$$

in which case all values except n are constant for the given group, and everything that has been said above holds also for hydrocarbons

Card 2/3

Chemical Structures and Physical and Chemical Properties PA - 2765  
of Hydrocarbons. New Laws and Calculation Methods.

of other classes with alkyl radicals. Analyses confirm the predictions of the theory. Furthermore, the author writes down equations for properties not subject to the equations (1) - (9) mentioned, as e.g. density and boiling temperature. For density the formula

$$d_n^{(m)} = \frac{a^{(m)} + b \cdot n}{g^{(m)} + h \cdot n}$$

applies. With respect to boiling temperature it is possible to show that it can be expressed in the case of the  $n$ -group of paraffins for a given pressure in first approximation by a fractured linear function. (5 citations from the author's publications)

ASSOCIATION: Moscow State University "M.V. LOMONOSOV"

PRESENTED BY: A.A. BALANDIN, Member of the Academy

SUBMITTED:

AVAILABLE: Library of Congress

Card 3/3

20-114-3-36/60

**AUTHORS:** Pozdyshev, V. A., Pentin, Yu. A., Tatevskiy, V. M.

**TITLE:** On the Kinetics of Reverse Isomerization Reaction (O kinetike reaktsii povorotnoy izomerizatsii)

**PERIODICAL:** Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 3, pp. 583-585 (USSR)

**ABSTRACT:** The potential barrier of the mutual transformation of the reverse isomers (transisomers or rotational isomers) of the molecules of the type of 1,2-dichloroethane,  $CXY_2 - CXY_2$ , can be represented by a formula found by Wolkenstein. Figure Nr 1 of the paper under review shows the shape of this function (curve Nr 1) for the transformation in the gaseous phase. In order to be able completely to determine the potential function, the three parameters  $V_0$ ,  $V_1$ ,  $V_2$  would have to be known. This is necessary not only for the formation of a general concept on the nature of the phenomenon of retarded internal rotation and of the reverse isomerism of molecules, but also for the purpose of computing their thermodynamic functions. There exist no direct methods for the determination of the constants  $V_0$ ,  $V_1$  of the retarding potential. In general, there was determined for the molecules of the type of 1,2-dichloro-

Card 1/3

## On the Kinetics of Reverse Isomerization Reaction

20-114-3-36/60

ethane only a certain effective value of the retarding potential, for instance obtained from comparing the entropy value obtained on the basis of the third thermodynamic law and the value that had been computed under assumption of the free internal rotation or under simplified assumptions on the shape of the barrier ( $V_2 = 0$ ,  $V_1 = V$ ). It is possible to determine accurately, by means of experiments, one of the above parameters ( $V_2$ ). The authors of the paper under review attempt to demonstrate that in some cases it is also possible to determine the second parameter ( $V_1$ ) by experiments. The value of  $V_{1\text{gas}}$  can be measured with relatively high accuracy during investigation of the process of isomerization in the solid phase. Knowledge of the values  $V_1$  and  $V_2$  obviously also makes it possible to determine the third parameter of the potential curve  $V_0$ , if the value of the effective barrier is obtained from comparing the experimental entropy value and the value computed statistically under assumption of the free internal rotation. Thus the method of investigating the reaction kinetics of reverse isomerization as presented for the first time in the paper under review opens new and interesting prospects for research in the field of the phenomena

Card 2/3

1000

**TEST ANSWERS**

TATEVSKIY, V. M. (MGU, Moscow)

V. M. Tatevskiy, Yu. A. Pentin, Ye. G. Treshchova, and Kh. Kesler,  
"Rotational Isomerism and the Energy of the Formation of Hydrocarbons."

report presented at the Symposium on Concepts of Conformation in Organic  
Chemistry which took place in Moscow at the IOKh AN SSSR (Institute of Organic  
Chemistry, AS USSR) from September 30 to October 2, 1958.

Izvestiya Akademii nauk SSR, Otdeleniye khimicheskikh nauk, 1959, No. 3, 561-564.

SOV. 156-58-2-1/48

AUTHORS: Akishin, P. A., Naumov, V. A. Tatevskiy, V. M.

TITLE: Electron-Diffraction-Investigations of the Molecular Structure of Gallium-Halides (Elektronograficheskoye issledovaniye stro,eniya molekul galogenidov galliya)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 2, pp. 205-209 (USSR)

ABSTRACT: The task of the present paper is the determination of the configuration and of the geometrical parameters of the molecules of the gallium-fluoride, chloride, and bromide by the diffraction-method with fast electrons, with a vapor-jet of the substance to be investigated. Because no data have been found so far in this field (except Ref 1) the authors planned to apply a thoroughly worked-out experimental method as well as a deciphering method. For this reason a new type of electron-diffraction camera was employed (Ref 2) and the ampulla was filled in a drying room. The elaboration of a vapor-electron-diffraction-pattern was carried out visually and photometrically (Ref 3). The process of decoding was carried out by means of: a) construction of curves of the radial distri-

Card 1/3

Electron-Diffraction-Investigations of the Molecular Structure of Gallium-Halides

SOV/ 156-58-2-1/48

bution (Ref 4), and b) the method of successive approximation (Ref 5). These investigations disclosed a new insight into the molecular structure of gallium-halides. The electron-diffraction-method proved the presence of monomer-molecules in vapor. Moreover the configuration was determined as well as the geometrical parameter of the  $\text{GaF}_3$ -molecule. The dimerisation of molecules was proved in vaporous gallium-chlorides and gallium-bromides, and more reliable data were obtained from their structure and their geometrical parameters (see table 2). There exist good reasons to assume analogy between structure of the crystalline gallium-halides and aluminium-halides. Data on the configuration of gas molecules of  $\text{Ga}_2\text{Cl}_6$  and  $\text{Ga}_2\text{Br}_6$  agree with data of solid aluminium, gallium, and indium halides (Ref 9) as well as solid trimethyl-aluminium. There are 3 figures, 2 tables, and 9 references, 2 of which are Soviet.

ASSOCIATION:

Kafedra fizicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Physical Chemistry of the State University imeni M. V. Lomonosov, Moscow)

Card 2/3

Electron-Diffraction-Investigations of the Molecular Structure of Gallium-  
Halides

SOV'156—58-2-1/48

SUBMITTED: October 21, 1957

Card 3/3

SOV/120-58-4-24/30

AUTHORS: Rusin, A. D. and Tatevskiy, V. M.

TITLE: A Time-Scan Spectrograph (Spektrograf s razvertkoy vo vremeni)

PERIODICAL: Priroda i tekhnika eksperimenta, 1958, Nr 4, pp 101-102  
(USSR)

ABSTRACT: A medium-quartz spectrograph is fitted with a rotating cylinder cassette, electrically interlocked with the shutter; the minimum rate of motion of the spectrum across the film is 500 mm/sec, the maximum 8000 mm/sec; time marks are inserted by chopping the incoming beam. The spectrograph is of aperture  $f/22$  and is used in studies on  $H_2/O_2$  explosions; the pressure wave in the vessel and the spectra are correlated in time by using an auxiliary photocell coupled to the chopper to mark on the pressure record. The system can also be used

Card 1/2

SOV/120-53-4-24/30

• A Time-Scan Spectrograph

contains 2 figures, no tables and 7 references, 2 of which are Soviet

ASSOCIATION: Khimicheskiy fakul'tet MGU (Chemistry Dept., MGU)

SUBMITTED: July 17, 1957.

Card 2/2

MAL'TSEV, A.A.; KORYAZHKIN, V.A.; MISYUREVICH, M.Ye.; TATEVSKIY, V.M.

Some modifications in the design of the recording system of the DFS-4 spectrophotometer to detect the isotope shift in the resonance line of lithium. Fiz.sbor. no.4:195-197 '58.  
(MIRA 12:5)

1. Khimicheskiy fakul'tet Moskovskogo ordena Lenina gosudarstvennogo universiteta imeni M.V.Lomonosova.  
(Lithium--Spectra) (Spectrophotometer)

20

5(4)

AUTHOR: Tatevskiy, V.M.

807/55-58-4-26/31

TITLE: New Regularities in the Physical-Chemical Properties of Hydrocarbons. IV. Linear Dependences Between Different Physical-Chemical Properties of Alkanes of Single Homologous Groups (Novyye zakonomernosti v fiziko-khimicheskikh svoystvakh uglevodorodov. IV. Lineynyye zavisimosti mezhdu razlichnyimi fiziko-khimicheskimi svoystvami alkanov ot del'nykh gomologicheskikh grupp)

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya: matematiki, fizika, khimiya, astronomiya, fiziki, khimiya, 1958, Nr 4, pp 205-208 (USSR)

ABSTRACT: The author [Ref 1,2,3], V.A.Kireyev [Ref 5], and M.Kh. Karapetyants [Ref 6,7] investigated theoretically the equation

$$(1) \quad P_n^{(m)} = A_{PQ}^{(m)} Q_n^{(m)} + B_{PQ}^{(m)}, \quad A_{PQ}^{(m)} = \text{const}, \quad B_{PQ}^{(m)} = \text{const}.$$

which expresses the linear connection between two different properties P and Q in the given (m-th) homology group of alkanes.

Card 1/2

New Regularities in the Physical-Chemical Properties of Hydrocarbons. IV. Linear Dependences Between Different Physical-Chemical Properties of Alkanes of Single Homologous Groups SOV/55-58-4-26/31

In the present paper the formula (1) is compared with experimental results; for some cases the constants A and B are given. The author discusses the applicabilities of (1). There are 3 figures, 1 table, and 9 Soviet references.

ASSOCIATION: Katedra fizicheskoy khimii (Chair of Physical Chemistry)

SUBMITTED: July 15, 1957

Card 2/2

*TATEVSKIY, V.I.*

AUTHORS: Kotov, Yu.I., Tyulin, V.I. and Tatevskiy, V.I. 51-4-2-25/28  
 TITLE: Raman Spectrum of Gaseous CO<sub>2</sub>. (Spektr kombinatsionnogo rasseyaniya gazoobraznoy CO<sub>2</sub>.)  
 PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.2, pp.271-272 (USSR)

ABSTRACT: Using apparatus described earlier (Ref.3) the authors obtained rotational spectrum of CO<sub>2</sub> at 1.5-2 atm pressure on a grating spectrometer with linear dispersion of 6.7 Å/mm in the second order. The spectral width of the spectrometer slit was 0.45 cm<sup>-1</sup>. The figure on p.271 shows a photograph of the spectrum obtained. Iron spectrum was used for calibration. The results are given in the table on p.272. For a linear CO<sub>2</sub> molecule displacements of rotational lines relative to the exciting line are given by

$$|\Delta\nu| = (4B-6D)(J+3/2) - 3D(J+3/2)^2,$$

where B and D are rotational constants, and J is the rotational quantum number. From the results obtained the constant D could not be determined, but one can say

Card 1/2

Raman Spectrum of Gaseous  $\text{CO}_2$ .

51-4 -2-25/26

that it is less than  $2 \times 10^{-6} \text{ cm}^{-1}$ . Neglecting  $\delta$  the author finds  $B_0 = 0.3895 \pm 0.0004 \text{ cm}^{-1}$ . This value of  $B_0$  agrees well with the value found from infrared spectra (Ref.2, p.422). Values of the vibrational frequencies for fully-symmetric vibration were also obtained. They were found to be 1205.7 and 1388.2  $\text{cm}^{-1}$ ; these values agree with the values given in Refs.4 and 5. There are 1 figure, 1 table and 5 references of which 1 is Soviet, 3 American and 1 a translation of American work into Russian.

ASSOCIATION: Moscow State University. (Moskovskiy gos. universitet)  
SUBMITTED: May 17, 1957.

1. Raman spectrum-Carbon dioxide analysis
2. Carbon dioxide-Spectrographic

Card 2/2

AUTHORS: Tatevskiy, V.M., Tunitskiy, L.N. and Novikov, M.M. SOV/51-5-5-23

TITLE: Vibrational Constants and Dissociation Energy of the BeF Molecule.  
(Kolebatel'nyye postoyannyye i energiya dissotsiatsii molekuly BeF)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 520-529 (USSR)

ABSTRACT: The paper reports a new investigation of the vibrational structure of the  $A^2\Pi-X^2\Sigma$  bands of BeF. The BeF spectrum was excited using gas-discharge tubes. Since the gas temperature is comparatively low in such tubes the rotational structure of the bands was weaker than in an arc and this reduced overlapping of bands and made it easier to observe new band edges. Two types of tubes were used in this work: one working under steady-state conditions (Fig 1) and the other for pulse excitation (Fig 2). Both tubes were filled with helium under 2-3 mm Hg pressure. BeF molecules were introduced into the discharge tubes by placing some BeF<sub>2</sub> in nickel boats inside the tubes. The tube used for steady-state discharges was U-shaped (1, in Fig 1) and had a quartz window (7, in Fig 1). The space around the electrodes (3, in Fig 1) was joined to the tube proper via liquid-hydrogen traps (4 and 5 in Fig 1). The tube was supplied from a 630 W transformer at 13 kV. The pulse-discharge source

Card 1/3

Vibrational Constants and Dissociation Energy of the BeF Molecule

SOV/51-5-5-5/23

consisted of a straight tube (1, in Fig 2) with a fluorite window (2, in Fig 2). Its electrodes (4, in Fig 2) were supplied every second (for 0.02 sec) with a 600-700 V, 9 A pulse. The spectra were recorded using a DFS-3 spectrograph of 2 Å/mm dispersion and 144000 resolving power. An iron spectrum was used as a wavelength standard. Measurements were made with 0.5 cm<sup>-1</sup> precision. The spectrum is shown in Fig 3. The measured band edges are given in Table 1. 48 new edges of Q<sub>1</sub>-branches and 54 new edges of R<sub>2</sub> and R<sub>1</sub> branches were recorded. Table 2 gives the rotational constants  $\omega_0$ ,  $\omega_0 x_0$  and  $\omega_0 y_0$  of BeF taken from Refs 1, 3, 5, 6 and from the results reported in the present paper. Table 3 gives the values of  $v'_{\max}$ ,  $v_{\max}$ ,  $G'_0(v'_{\max})$  and  $G''_0(v_{\max})$  allowing for (columns I) and neglecting (columns II) the second coefficient of anharmonicity  $\omega_0 y_0$  of the BeF molecule. Table 4 gives the recommended, most reliable values of the spectroscopic constants of the BeF molecule

Card 2/3

SOV/51-5-5-5/23

Vibrational Constants and Dissociation Energy of the BeF Molecule

This table gives the dissociation energies of the  $X^2\Sigma$  and  $A^2\Pi$  states as  $8 \pm 0.5$  and  $3.9 \pm 0.5$  eV respectively. The author thanks L.V. Gurvich for his advice. There are 4 figures, 4 tables and 7 references.

SUBMITTED: December 6, 1957

Card 3/3

1. Beryllium fluoride--Spectrographic analysis 2. Molecules--Spectra  
3. Molecules--Energy 4. Gas discharges--Applications

SOV/51-5-5-9/23

AUTHORS: Treshchova, Ye.G., Tatevskiy, V.M., Skvarchenko, V.R. and Levina, Z.Ya.

TITLE: Raman Scattering Spectra of Hydrocarbons of Various Types. (Spektry kombinatsionnogo rasseyaniya uglevodorodov razlichnykh klassov).  
V. Raman Scattering Spectra of Certain Bi- and Tri-Cyclic Diene Hydrocarbons (V. Spektry kombinatsionnogo rasseyaniya nekotorykh bi- i tritsiklicheskich diyanovykh uglevodorodov).

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 553-560 (USSR)

ABSTRACT: The Raman spectra of the following bi-cyclic diene hydrocarbons with isolated and conjugated bonds were obtained: 2,2'- and 1,1'-dicyclohexenyl, 2,2'- and 1,1'-dicyclopentenyl, and dicyclopentadiene. 2,2'-dicyclohexenyl and 2,2'-dicyclopentenyl were synthesized by the action of Mg on 3-chlorocyclohexene-1 and 3-chlorocyclopentene-1, respectively. 1,1'-dicyclohexenyl and 1,1'-dicyclopentenyl were obtained by de-hydration of the corresponding pinacols (pinacones). Dicyclopentadiene of technical grade was purified by double washing with a concentrated alkaline solution, by washing with water, drying and vacuum distillation. The boiling point, vapour pressure, refractive index and density at 20°C, etc., are given for all the five hydrocarbons in Table 1. The

Card 1/2

Raman Scattering Spectra of Hydrocarbons of Various Types. V. Raman Scattering Spectra of Certain Bi-Space and Tri-Cyclic Diene Hydrocarbons

SOV/51-5-5-9/23

Raman spectra of 2,2'-dicyclopentenyl and of dicyclopentadiene were obtained using a glass "Shtynkel'" spectrograph, as described in Refs 1, 2. The Raman spectra of 2,2'-dicyclohexenyl (Fig 1 curve v), 1,1'-dicyclohexenyl (Fig 1 curve a) and of 1,1'-dicyclopentenyl (Fig 1 curve b) were obtained using a triple-prism glass spectrograph ISP-51 with photoelectric recording. Table 2 gives the values of the Raman frequencies and intensities of all the five hydrocarbons. Reproducibility of the results was satisfactory and the differences between individual measurements of the strong lines did not exceed  $\pm 3\%$  (see Fig 2). The results obtained are discussed and interpreted in detail. As part of the discussion the authors quote the  $C=C$  frequencies and intensities of various dienes with isolated and conjugated double bonds (Table 3). There are 2 figures, 3 tables and 12 references, 11 of which are Soviet and 1 German.

SUBMITTED: December 31, 1957

Card 2/2 1. Hydrocarbons--Spectra 2. Raman spectroscopy 3. Spectrophotometers  
--Performance

AUTHORS: Kuzyakov, Yu.Ya. and Tatevskiy, V.M.

SOV/51-5-6-10/19

TITLE: New Bands of the CF Molecule (Novyye polosy molekuly CF)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 6, p 699 (USSR)

ABSTRACT: Andrews and Barrow (Ref 1) found only 4 bands belonging to the  $A^2\Sigma-X^2\Pi$  transition of the CF molecule: (0,0), (0,1), (1,0), (1,1). Other bands of this system could not be observed because of strong overlapping by complex bands of the CF<sub>2</sub> molecule (Refs 1, 2). Under more stable conditions of an electric discharge through a stream of CF<sub>4</sub> vapour, the present authors were able to decrease considerably the CF<sub>2</sub> band intensities and to measure 9 more bands of the  $A^2\Sigma-X^2\Pi$  transition. Assuming that the edges of the new bands are due to the same branches as in the case of the 4 bands reported earlier, the authors calculated the positions of the zero lines of the 9 bands: (0.2), (0.3), (0.4), (0.5), (0.6), (1.4), (1.5), (1.6), (1.7), observed by the author for the first time and listed in col. 1 of a table on p 599. This table gives the zero lines found experimentally (col. 2) and calculated (col. 3) from the vibrational constants given in Ref 1. The good agreement between the experimental and calculated values confirms the correctness of the vibrational analysis. More precise

Card 1/2

New Bands of the CF Molecule

SOV/51-5-6-10/19

values of the zero lines and the vibrational constants will be published later, when the full analysis of the rotations is complete. Measurements of the fine structure of the (0.2) and (0.3) bands yield the following values of the rotational constants:  $B_2'' = 1.300 \text{ cm}^{-1}$  and  $B_3'' = 1.341 \text{ cm}^{-1}$ . The absence of the transitions with  $v' = 2$  both in the experiments reported in the present paper and those reported by other workers suggests pre-dissociation between vibrational levels  $v' = 1$  and  $v' = 2$  of the  $A''\Sigma$  state. In this case the upper limit of the dissociation energy of the ground state of the CF molecule should not exceed 5.8 eV. This is a complete translation except for the table. References: (1) E.B. Andrews, R.F. Barrow, Proc. Phys. Soc. London, A64, 481, 1951. (2) P. Venkateswarlu. Phys. Rev., 77, 676, 1950.

SUBMITTED: April 12, 1958

Card 2/2

TATEVSKIY, V.M.

New aspects of the physicochemical properties of hydrocarbons. Part 4:  
Linear dependence of the various physicochemical properties of alkanes  
of different homologous series. Vest.Mosk.un.Ser.mat., mekh., astron.,  
fiz., khim. 13 no.4:205-208 '58. (MIRA 12:4)

1. Kafedra fizicheskoy khimii Moskovskogo universiteta.  
(Paraffins)

AUTHORS: Tatevskiy, V. M., Benderskiy, V. A. SOV/79-28-7-4/64

TITLE: New Rules Governing the Physicochemical Properties of Hydrocarbons. II. (Novyye zakonomernosti v fiziko-khimicheskikh svoystvakh uglevodorodov.II)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 7, pp. 1733 - 1737 (USSR)

ABSTRACT: In the present paper the authors show that the theory suggested by the authors (Refs 1-3) that all alkanes could be divided into groups according to the principle of the same structure of the ramified fragments of the hydrocarbon chains is actually proved experimentally by various physicochemical properties of paraffin hydrocarbons (alkanes). Such groups are given in the table. According to this table for each group of alkanes one of the physicochemical quantities typical of the group must depend linearly on the number of carbon atoms  $n$  in the alkane molecule of the given group (Schemes 1 and 2, where  $P_{22}$  denotes the constant coefficient, and Fig 1). In the abbreviated formula (2)  $P$  denotes the physicochemical constant,  $m$  a group,  $n$  the number of carbon atoms,  $a^{(m)}$  the constant for the given group and  $\beta$  that

Card 1/3

New Rules Governing the Physicochemical Properties  
of Hydrocarbons.II.

SOV/79-28-7-4/64

for all groups. In figures 1-4 it is shown to which degree the linear rules(1) and (2) in every alkane group for various physicochemical properties of the alkanes are satisfied. All rules to be seen from the table and the figures can easily be used for the calculation of the physicochemical properties of the hydrocarbons of the given group not to be investigated, as far as the corresponding experimental data for some of the hydrocarbons of the same group are given, which is also of practical importance. There are 6 figures, 1 table, and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: June 1, 1957

Card 2/3

AUTHOR:

Tatevskiy, V. M.

SOV/79-28-11-7/55

TITLE:

New Rules Governing the Physico-Chemical Properties of  
Hydrocarbons (Novyye zakonomernosti v fiziko-khimicheskikh  
svoystvakh uglevodorodov)  
III. The Heats of Crystallization of n.-Alkanes (III. Teploty  
kristallizatsii n.-alkanov)

PERIODICAL:

Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 2935-2939  
(USSR)

ABSTRACT:

Earlier, V. M. Tatevskiy (Refs 1,2) showed that such properties of hydrocarbons as molecular volume and molecular fraction, heat of formation from atoms and elements, heat of combustion, heat of evaporation, logarithm of vapor pressure and others in every alkane group with a characteristic ramification of the carbon chain depend on the number n of the carbon atoms in the alkane compound. This paper deals with the problem of similar rules governing the crystallization heat of alkanes. Due to the insufficient data existing, and as only the n.-alkanes are an exception of this rule, the author had to restrict to the latter. In determining the rules governing the heats of crystallization, difficulties

Card 1/3

New Rules Governing the Physico-Chemical Properties  
of Hydrocarbons.

SOV/79-28-11-7/55

III. The Heats of Crystallization of n.-Alkanes

arise that are connected with the occurrence of the solid phase, which is not the case if the properties of the gaseous phase and the liquid phase can be determined. It is important that in the crystallization various crystalline modifications can occur. Simple rules between the heat of crystallization and the atomic number of carbon in the molecule can exist only if the heats of crystallization of the alkanes are in relation to one and the same modification. This fact is important in the establishment of rules governing the heats of crystallization of n.-alkanes, as their crystalline modification is different in dependence on the even or odd atomic number, as well as on other properties. Thus, the dependence of the heats of crystallization of the n.-alkanes on the number of carbon atoms in the molecule was investigated. It was shown that the heats of crystallization of the low members of the n.-alkane series linearly depend on the atomic number, but that these dependencies of the odd and even numbers n of the carbon atoms do not agree as the corresponding hydrocarbons are crystallized in different modifications.

Card 2/3

New Rules Governing the Physico-Chemical Properties  
of Hydrocarbons.

SOV/79-28-11-7/55

III. The Heats of Crystallization of n.-Alkanes

The figures and tables enclosed illustrate the results of  
these investigations. There are 5 figures, 2 tables, and  
3 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State  
University)

SUBMITTED: July 7, 1957

Card 3/3

TATSEVSKIY, V. M.

75-1-20/32

AUTHORS: Dombrovskaya, U. , Pentin, Yu. A. , Dombrovskiy, Ya., Tatovskiy, V. M. , Kochetkov, H. K.

TITLE: The Investigation of the Tautomerism of the Alkyl- $\beta$ -Aminovinyl Ketones According to Infrared Absorption Spectra (Issledovaniye tautomerii alkil- $\beta$ -aminovinilketonov po infrakrasnym spektram pogloshcheniya)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 1, pp. 135-140 (USSR)

ABSTRACT: The present work is directly connected with earlier works (reference 1 and 2). The investigations in these works referred to the clarification of the question of the existence of enamino-imide-tautomerism. The present work is also devoted to the same question. The spectra obtained experimentally are discussed here and compared with each other. 1) The range 2800 - 3500  $\text{cm}^{-1}$ , of the valence-X-H-oscillations. In the spectrum of the solid alkyl- $\beta$ -aminovinyl ketone, i.e. in the  $\alpha$ -form of the substance absorption bands with 3140 and 3222  $\text{cm}^{-1}$  corresponding to the oscillations of the OH group, are present. It is shown that the  $\alpha$ -form is a more or less pure imide-enol form. 2) The range 1450 - 1700  $\text{cm}^{-1}$  of the double bonds. All data obtained here speak in favour of the fact that the  $\alpha$ -form corresponds

Card 1/3

The Investigation of the Tautomerism of the Alkyl- $\beta$ -Aminovinyl Ketones According to Infrared Absorption Spectra

75-1-26/32

to the imide-enol form, and that the transformation product of the  $\alpha$ -form and the mixture of the  $\alpha$ - and  $\beta$ -form represents a mixture of the imide-enol- and of the enamine-ketone-form. 3) The range 700 - 1450  $\text{cm}^{-1}$ . In the spectrum of the mixture of the  $\alpha$ - and  $\beta$ -forms of the methyl- $\beta$ -aminovinyl ketone 1250 - and 1002  $\text{cm}^{-1}$  bands are present, which were not observed in the spectrum of the  $\alpha$ -form and are characteristic for the enamine-ketone-form. Generally, an interpretation of the bands of this range is very difficult. 4) The range 400 - 700  $\text{cm}^{-1}$ . In the spectrum of the mixture of  $\alpha$ - and  $\beta$ -forms of homologues of the alkyl- $\beta$ -aminovinyl ketones wide bands with an absorption centre  $\sim 650 \text{ cm}^{-1}$  are present. These bands become essentially more intensive in the spectra of the  $\alpha$ -form. It is assumed that these ones correspond to the deformation oscillations of the hydroxyl group of the imide-enol-form. It may be assumed that the conclusions drawn with respect to the other ranges also apply for this range. Summing up it is proved on the base of the infrared absorption spectra (in the range of 400 - 3500  $\text{cm}^{-1}$ ) of the methyl- $\beta$ -aminovinyl ketone, of its homologues and of some model-compounds in different physical states that the alkyl- $\beta$ -aminovinyl ketones exist in tautomeric forms; viz. as an enamine-ketone-form (A) and as an

Card 2/3

75-1-20/32  
The Investigation of the Tautomerism of the Alkyl- $\beta$ -Aminovinyl Ketones According  
to Infrared Absorption Spectra

imide-enol-form (B). There are 1 figure, and 15 references, 6 of  
which are Slavic.

ASSOCIATION: Moscow State University imeni M. V. Lomonosov  
(Moskovskiy gosudarstvenny universitet im. M. V. Lomonosova)

SUBMITTED: October 24, 1956

AVAILABLE: Library of Congress

Card 3/3

**AUTHORS:**

Ziborov, V. A., Pentin, Yu. A.,  
Tatevskiy, V. M.

76-32-3-33/43

**TITLE:**

Letters to the Editor (Pis'ma v redaktsiyu).  
Rules Governing the Mean Magnetic Susceptibility of  
Paraffin Hydrocarbons and Alcohols (Zakonmernosti  
v srednikh magnitnykh vospriimchivostyakh parafinovykh  
uglevodorodov i spirtov)

**PERIODICAL:**

Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 3,  
pp. 707-709 (USSR)

**ABSTRACT:**

In connection with work performed on types and subtypes of  
hydrocarbon bonds and with corresponding analysis of their  
physicochemical properties a formula is given by which the  
phenomena mentioned in the title can be determined. The  
results of the determinations performed with a series of  
substances are given in a table. They show good agreement  
with the experimentally obtained values. The given scheme  
of calculation is more suitable than Pascal's scheme (and the  
modifications), and moreover does not possess any additive

Card 1/2

Letters to the Editor

Rules Governing the Mean Magnetic Susceptibility of Paraffin  
Hydrocarbons and Alcohols

76-32-3-33/43

constants. The applied theoretical expressions of the stability of the physicochemical quantities (with the nature of a capacity factor) can, according to the results in comparison with the experimental data, be well used. In this manner the importance of the physicochemical properties of organic compounds can be explained and predicted on a much broader basis than it was possible before. There are 2 tables and 8 Soviet references.

ASSOCIATION:

Moskovskiy Gosudarstvennyy universitet im. M.V. Lomonosova  
(Moscow State University named M. V. Lomonosov)

SUBMITTED:

October 17, 1956

Card 2/2

AUTHOR: Tatevskiy, V. M.

76-32-5-37/47

TITLE: Linear Relationship Between Various Physico-Chemical Properties of Hydrocarbons (Lineynyye zakonomernosti mezhdu razlichnymi fiziko-khimicheskimi svoystvami uglevodorodov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 5, pp.1168-1170 (USSR)

ABSTRACT: Already in the papers by M. Kh. Karapet'yants (Refs 1 - 3) a linear relation between two properties of certain groups of related compounds was found. The present work deals with the theme mentioned in the title and starts from the earlier developed theoretical representations. It was already proved that the hydrocarbons can be divided into groups in which the ramification of the chain parts and the cycles are the same, with a number of properties depending linearly on the number of carbon atoms  $n$  in the groups. Starting from the case that in various hydrocarbon groups two different physico-chemical properties are placed next to each other and that they are measured at various temperatures, pressures etc., it is found after a number of considerations and mathematical deductions

Card 1/2

Linear Relationship Between Various Physico-Chemical Properties of Hydrocarbons 76-32-5-37/47

that in the case of a change of temperature a comparison of the property values can not be carried out in the given way. There are 8 references, 8 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 19, 1957  
1. Hydrocarbons--Physical properties 2. Hydrocarbons---  
Chemical properties

Card 2/2

AUTHOR: Tatevskiy, V. M. SOV/76-32-6-6/46

TITLE: ~~On the Rules Governing the Structure and the Physico-Chemical Properties of Alkanes~~  
The Rules Governing the Structure and the Physico-Chemical Properties of Alkanes (Zakonomernosti v stroenii i fiziko-khimicheskikh svoystvakh alkanov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp. 1226 - 1230 (USSR)

ABSTRACT: With an increase of the number of carbon atoms in hydrocarbons the number of possible isomers rises rapidly. For this reason A.P.Meshcheryakov proposed not to compute single isomers in investigations of alkanes, but families with the same number of carbon atoms and comparable values of the fundamental physical and chemical properties. In this connection two important problems emerge: 1) The determination of the families, the hydrocarbons of each class decompose. 2) The determination of the number of isomers pertaining to each family. In order to solve the first problem, two stages of consideration are adopted for alkanes. On the one hand the alkanes with a given number of carbon atoms are divided into groups, which possess the same number of primary, secondary, tertiary and quaternary C-atoms. On the other hand the alkanes with the possible  $C_1-C_j$  bindings

Card 1/3

The Rules Governing the Structure and the  
Physico-Chemical Properties of Alkanes

SOV/76-32-6-6/46

are determined for each group, that is to say the number  $n_{ij}$  of the bindings  $C_i-C_j$  of each sub-type is determined. The equations pertinent to the first stage are deduced, as well as those pertinent to the second stage. In the latter the problem of the relation of the carbon atom group of each group with the possible number of C-C bindings of the various sub-types, primary-primary, primary-secondary, primary-tertiary etc. is taken into consideration, thus permitting to determine the number of C-C bindings. The results obtained furnish a further contribution towards a solution of the problems of a bulk computation of the physical and chemical properties of higher alkanes. There are 9 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova  
(Moscow State University imeni M.V.Lomonosov)

SUBMITTED: October 17, 1956  
Card 2/3

The Rules Governing the Structure and the  
Physico-Chemical Properties of Alkanes

SOV/76-32-6-6/46

1. Methanes--Physical properties    2. Methanes--Chemical properties    3. Methanes  
--Structural analysis    4. Methanes--Test results    5. Mathematics

Card 3/3

*TATEVSKIY, V. M.*

AUTHORS: Akishin, P. A., Vilkov, L. V., Tatevskiy, V. M. 20-1-33/58

TITLE: Electron Diffraction Study of the Chloroprene Molecule  
(Elektronograficheskoye issledovaniye stroyeniya molekuly khloroprena).

PERIODICAL: Doklady AN SSSR 1958, Vol. 118, Nr 1, pp. 117-120 (USSR)

ABSTRACT: The task of the present work is the determination of the spacial configuration and the geometric parameter of the chloroprene molecule by means of the method of the diffraction of quick electrons with a vapour jet of the substance to be investigated. The apparatus for the taking of electronograms was already described in a preliminary work (ref. 1). With long waves of electrons of from 0,0520 to 0,0540 Å 7 series of electronograms were obtained. With these electrons 8 maxima and 7 minima were measured by means of visual evaluation of their intensity. From the experimental data obtained and given in a table the curve of radial distribution was constructed. The calculation made with a variation of the values of the intensity of the extremes proved the reliability of the curve of radial distribution. The attachment of the peaks of the curve of radial distribution to interatom distances in the chloroprene molecule arranged by the authors is

Card 1/3

## Electron Diffraction Study of the Chloroprene Molecule.

20-1-33/58

mentioned here. Then the theoretic curves of intensity of various models (the structure parameters of which are mentioned in a table) are calculated according to the method of successive approximation. Not with all models the theoretic intensity curves coincide with the experimental curve of scattered electrons. This non-coincidence exists e.g. for the plain trans-isomer, the plain cis-isomer as well as for the rotated isomer with a rotation of the vinyl-groups by  $90^\circ$  around the  $C_2 - C_3$  group. The best coincidence is obtained for the plain model of the chloroprene molecule with trans-position of double compounds and  $C_1C_2C_3$ - and  $C_2C_3C_4$ - angles differing by  $5^\circ$ , as well as for the non-plain model of the molecule with a rotation of the vinyl-groups around the only  $C_2-C_3$ -compound by  $32^\circ$  (rotation from the trans-position) and with equal  $C_1C_2C_3$ - and  $C_2C_3C_4$ - angles. The main parameters of the two latter models coincided completely with the interatom distances obtained from the curve of radial distribution. The two most probable structures resulting from the electronographic investigation of the structure of the chloroprene molecule are given with their numeric parameters. The double carbon compounds in the chloroprene molecule have a trans-figuration or a similar configuration, which coincides with

Card 2/3

Electron Diffraction Study of the Chloroprene Molecule.

20-1-33/58

the earlier obtained infrared- and ultraviolet spectra of chloroprene. There are 3 figures, 2 tables, and 11 references, 3 of which are Slavic.

ASSOCIATION: Moscow State University imeni M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova).

PRESENTED: January 3, 1957, by N. N. Semenov, Academician.

SUBMITTED: December 29, 1956

AVAILABLE: Library of Congress

Card 3/3

24(7)

AUTHORS:

Akishin, P. A., Naumov, V. A., Tatevskiy, V. N. SOV/156-59-2-1/48

TITLE:

The Electronographical Investigation of the Structure of the Molecules of the Neodymium Halogen Compounds (Elektronograficheskoye issledovaniye stroyeniya molekul galogenidov neodima)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 2, pp 229-232 (USSR)

ABSTRACT:

In a previous investigation it was found (Ref 1) that the molecules of  $\text{LaX}_3$  ( $X$  = halogen) have a plane configuration with the lanthanum atom in the center of an equilateral triangle. Because of the similar structure of the outer electron shells a similar configuration was to be expected in the case of neodymium. The measurements carried out by means of an electronograph of the Chemical Department of the MGU (Moskovskiy gosudarstvennyy universitet - Moscow State University) confirm this. The electronograms were read according to the method of radial distribution and according to the method of successive approximation. Figure 1 shows the curves of radial distribution. The two peaks of the curve are interpreted as  $r(\text{Nd} - X)$  and  $r(X - X)$ . They were in agreement with the expected plane configuration. The RMS oscillation amplitudes were computed

Card 1/2

The Electronographical Investigation of the Structure of the Molecules of  
the Neodymium Halogen Compounds

SOV/156-59-2-1/48

and the theoretical curves of the scattering intensity were plotted (Fig 2) which are in good agreement with the experimentally found curves. Table 2 shows the RMS oscillation amplitudes for  $\text{NdF}_3$ ,  $\text{NdCl}_3$ ,  $\text{NdBr}_3$  and  $\text{NdJ}_3$  and the geometrical parameter. The experimentally found symmetrical configuration of  $\text{LaX}_3$  (Ref 1),  $\text{YX}_3$  (Ref 7) and now also  $\text{NdX}_3$  confirm the quantum chemical assumptions (Ref 8). In the series chlorine - bromine - iodine, neodymium - halogen follow approximately a linear law, whereas the distance neodymium - fluorine is considerably reduced, as it is the case with a number of fluorine compounds. There are 2 figures, 2 tables, and 10 references, 5 of which are Soviet.

PRESENTED BY: Kafedra fizicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Physical Chemistry, Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 13, 1958

Card 2/2

24(7)

SOV/156-59-2-2/48

**AUTHORS:** Kuzyakov, Yu. Ya., Tatevskiy, V. M.  
**TITLE:** On the Spectrum of the CCl-Molecule (O spektre molekuly CCl)  
**PERIODICAL:** Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 2, pp 233-236 (USSR)

**ABSTRACT:** The oscillation analysis of the absorption bands of the electric discharge in carbon tetrachloride as suggested by P. Venkatesvarlu (Ref 2) is rejected and a new oscillation analysis is given. Table 1 shows the measured spectral lines and the frequencies in the range of 2713.2 - 2927.7 Å reduced in vacuum. The analysis was made on the basis of the similarity of the bands of CCl and those of the isoelectronic molecules CF, SiF, SiCl on the following assumptions: 1) The investigated bands belong to a  $^2\Sigma - ^2\Pi$ -transition; 2) the ground state of CCl is normal as in the case of CF, SiF and SiCl; 3) on the basis of the general process of the increasing doublet separation in the series SiF - SiCl - SiBr it may be expected that the doublet separation will in the case of CCl be 1.5 - 2 times that of CF ( $77 \text{ cm}^{-1}$ ), i.e. approximately  $130 \text{ cm}^{-1}$ ; 4) the distance between the atoms C and Cl in the diatomic molecule CCl was equated with the distance in  $\text{CCl}_4$ ;

Card 1/2

## On the Spectrum of the CCl-Molecule

SOV/156-52-2-2/48

herefrom follows a rotation constant in the ground state of the CCl-molecule of approximately  $0.6 \text{ cm}^{-1}$ ; 5) following Venkatesvarlu the most intensive group of bands belongs to the sequence  $\Delta v = 0$ . On the basis of the expressions given by R. Mulliken (Ref 4) for the terms of the upper and lower electron state the formula was derived for the  $P_1^-$ ,  $P_2^-$ ,  $Q_1^-$  and  $Q_2^-$ -branches of the  $^2\Sigma^- - ^2\Pi^-$ -transition. The measured distances between the individual bands were in good agreement with the calculated values. The formula for the Q-edges was set up. The doublet splitting amounted to  $A = 118 \text{ cm}^{-1}$ . The dissociation energy of the ground state of the CCl-molecule calculated by means of linear extrapolation proved to be approximately equal to 4.5 ev. There are 1 figure, 2 tables, and 4 references.

PRESENTED BY: Kafedra fizicheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Physical Chemistry, Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 11, 1958

Card 2/2

24(7)

SOV/156-59-2-3/48

AUTHORS: Kuzyakov, Yu. Ya., Tatevskiy, V. M.

TITLE: On the Spectrum of the Molecule  $\text{CCl}^+$  (O spektre molekuly  $\text{CCl}^+$ )

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 2, pp 237-239 (USSR)

ABSTRACT: The authors investigated the luminescence spectrum of an electric discharge in carbon tetrachloride vapor. On this occasion they found the bands described by Barrow (Ref 1), however, in higher number (10 instead of 4) within the range 2337 - 2341 Å. The method of the experiments carried out by the authors is distinguished from Barrow's method by the fact that the authors used helium as carrier of the electric discharge. The bands were found to belong to the molecule  $\text{CCl}^+$  as the oscillation constants (Table 1) calculated for this molecule according to the Deslaudres formula were in good agreement with the experimental values. The ionization potential of the  $\text{CCl}$ -molecule was determined to amount to 9.5 ev which agrees well with the ionization potentials of CO and  $\text{O}_2$  with respect to the order of magnitude. There are 2 tables and 2 references, 1 of which is Soviet.

Card 1/2

On the Spectrum of the Molecule  $\text{CCl}^+$

SOV/156-59-2-3/48

PRESENTED BY: Kafedra fizicheskoy khimii Moskovskogo gosudarstvennogo  
universiteta im. M. V. Lomonosova  
(Chair of Physical Chemistry, Moscow State University  
imeni M. V. Lomonosov)

SUBMITTED: July 11, 1958

Card 2/2

AUTHORS: Akishin, P.A., Naumov, V.A. and <sup>SOV/70-4-2-8/36</sup> Tatevskiy, V.M.

TITLE: An Electronographic Investigation of the Structure of Molecules of the Halides of Gallium and Yttrium (Elektronograficheskoye issledovaniye stroyeniya molekul galogenidov galliya i ittriya)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 2, pp 194-200 (USSR)

ABSTRACT: Investigations were made, as in the previous paper, using the sector-photometric method and the new electronograph at the MGU. The results were analysed by successive approximations and the method of radial distributions. Theoretical and experimental distribution curves are reproduced.  $\text{Ga}_2\text{Cl}_6$  and  $\text{Ga}_2\text{Br}_6$  were dimeric with Ga-Ga distances of 3.28 and 3.41 Å, respectively, and angles  $\text{X}_3\text{-Ga}_2\text{-X}_4$  of  $112^\circ \pm 3$  and  $110^\circ \pm 3$  and  $\text{Ga}_1\text{-X}_5\text{-Ga}_2$  of  $91^\circ \pm 3$  and  $93^\circ \pm 3$ . All other distances are tabulated. The other compounds  $\text{GaF}_3$ ,  $\text{GaI}_3$ ,  $\text{YF}_3$ ,  $\text{YCl}_3$ ,  $\text{YBr}_3$  and  $\text{YI}_3$  were plane triangular molecules with Me-X

Card1/2

SOV/70-4-2-8/36

An Electronographic Investigation of the Structure of Molecules  
of the Halides of Gallium and Yttrium

distances of 1.88, 2.44, 2.04, 2.47, 2.63, 2.80  $\pm$  0.05  $\overset{0}{\text{\AA}}$ ,  
respectively. These observations contradict some by  
Brode (Ref 3).  $\text{Ga}_2\text{F}_6$  molecules were present (as shown  
by mass spectrometry) to an extent of  $\leq 1\%$  and  $\text{Ga}_2\text{I}_6$   
molecules were present to about 8% in  $\text{GaI}_3$  at the m.p.  
There are 5 figures, 3 tables and 13 references, 3 of  
which are Soviet, 10 English.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni  
M.V. Lomonosova (Moscow State University imeni  
M.V. Lomonosov)

SUBMITTED: July 15, 1958

Card 2/2

23(

SOV/77-4-3-3/16

AUTHORS: Galashin, Ye.A. and Tatevskiy, V.M.

TITLE: On the Phenomena of Photographic Reversal  
I. The Effect of Bromides, Desensitizers, Oxidizers  
and Reducing Agents on Photographic Reversal

PERIODICAL: Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, 1959, Vol 4, Nr 3, pp 175-182 (USSR)

ABSTRACT: The authors carried out experiments to demonstrate the effect of surplus KBr, various oxidizers, desensitizers and reducing agents on KBr transparencies, which after treatment with one of these agents were exposed to the radiation of mixed red and violet light. Diagram Nr 1 shows the scheme of the illuminator. Starting from the assumption that solarization and the Herschel effect are intimately related [reference 13\_7, the authors, in order to establish, if possible, an experimentally proved parallelism between these phenomena, exposed some transparencies to white light prior

Card 1/7

SOV/77-4-3-3/16

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

to the common procedure. The effect of surplus bromides in the emulsion on photographic reversal and the Herschel effect under radiation is illustrated in graphs 2-4. They show that an increase of the bromide concentration results in a loss of light sensitivity in the emulsion, and an intensification of the above-mentioned phenomena. In one case (graph 3) the authors used only violet light, but the curve did not change its basic character. Solarization did not depend on the admixture of long-wave radiation. The experiments carried out with oxidizers (quinone) and desensitizers (pinacryptol) showed the same effects as the bromide experiments. An increase in the oxidizer and desensitizer concentration resulted in a diminution of the maximum optical density of the produced image and a gradual moving of the

Card 2/7

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

maxima towards shorter exposures (Graphs 5-6). The results of the experiments with reducing agents (hydroquinone, sodium sulfite and sodium nitrite) are illustrated in Graphs 7-10. Graphs 7-9 represent the effect of the reducing agents on photographic reversal. Graph 10 shows the effect of sodium nitrite on the Herschel phenomenon. An increase in the value of maximum optical density and the shift of the maximum towards longer exposures is a general characteristic of all these blackening curves. Graph 10 is of special interest. Under the effect of red and violet light the latent image (the transparency had been previously exposed to white light) was first partially resolved, but soon a second reversal reestablished itself and increased the former stability. On the basis of the identity of

Card 3/7

SOV/77-4-3-3/16

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

the mechanisms of solarization and the Herschel effect, the authors assume that the observed regularities in photographic reversal can be explained by the coagulation theory [reference 7]. The surplus bromides in the layer, and the presence of oxidizers and desensitizers reduce the quantum yield of the silver photolysis and hamper the development of new silver "germs". This circumstance creates favorable conditions for the processes of coagulation and recrystallization of the silver particles, which in this way lose their catalytic activity. The processes are characterized by resolution of the minute active nuclei, which yield to the growth of a small number of large but inactive particles. Metallic silver set free during photolysis does not create new nuclei, but deposits on already formed silver particles. As a result of the reduction

Card 4/7

SOV/77-4-3-3/16

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

in the number of active nuclei reversal takes place, manifesting itself as solarization, as well as Herschel effect. The increase in bromide and desensitizer concentration additionally hampers the development of new nuclei and creates still more favorable conditions for the coagulation and recrystallization of the silver "germs". The reversal occurs sooner and in lesser optical densities. In this way the diminution of the maximum optical density and the shift of the maximum of the blackening curve towards shorter exposures can be explained. The presence of reducing agents in the layer has the opposite effect. Due to the increased rate of photolysis of the silver bromide, favorable conditions are given for the development of many active centers. Coagulation is hampered. Solarization is not observed at all or only later.

Card 5/7

SOV/77-4-3-3/16

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

The maximum of optical density is increased and the maximum is shifted towards longer exposures. The Herschel effect can be noticed only in the first moment, when the elimination of the catalytic activity (a result of the coagulation of the numerous silver centers formed during the exposure) cannot be compensated for by the formation of new nuclei due to the effect of the long-wave radiation. The authors quote the Soviet scientists Kravets and his collaborators [reference 19\_7, Ye.A. Kirillov [reference 9\_7 and K.V.Chibisov [reference 8\_7 in support of their opinion concerning the character of the observed phenomena. There are 9 graphs, 1 diagram and 33 references, 20 of which are German, 8 Soviet, 4 English and 1 French.

Card 6/7

SOV/77-4-3-3/16

On the Phenomena of Photographic Reversal. I. The Effect of Bromides, Desensitizers, Oxidizers and Reducing Agents on Photographic Reversal

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova, khimicheskiy fakul'tet (Moscow State University imeni M.V.Lomonosov, Chemistry Department)

SUBMITTED: 2 April, 1957

Card 7/7

SOV/51-6-1-8/30

AUTHORS: Chumayevskiy, N.A., Tatevskiy, V.M. and Yur'yev, Yu.K.

TITLE: The Absorption and Raman Spectra of Selenophene and Its Methyl Homologues (Spektry pogloshcheniya i spektry kombinatsionnogo rasseyaniya selenofena i yego metilgomologov)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 1, pp 45-50 (USSR)

ABSTRACT: The paper reports studies of the infrared and ultraviolet absorption spectra and Raman spectra of selenophene (I), 2-methylselenophene (II), 3-methylselenophene (III), 2,3-dimethylselenophene (IV), 2,4-dimethylselenophene (V), 3,4-dimethylselenophene (VI). The Raman spectra were obtained on a Steinheil spectrograph (linear dispersion 0.1 mm/Å). The absorption spectra in the infrared were obtained using an IKS-11 spectrometer with LiF (3300-6000 cm<sup>-1</sup>), NaCl (660-3000 cm<sup>-1</sup>) and KBr (400-600 cm<sup>-1</sup>) prisms. An infrared spectrometer VIKSM-3 with a NaCl prism was also used. The ultraviolet absorption spectra were obtained in isoctane using a SF-4 spectrophotometer. Measurements of the infrared spectra, obtained using the VIKSM-3 spectrometer, and of the ultraviolet spectra were carried out at the Optics Laboratory of I.N.E.O.S. of the Academy of Sciences of the U.S.S.R. Selenophene and its homologues studied in the present work

Card 1/3

SOV/51-6-1-8/30

## The Absorption and Raman Spectra of Selenophene and Its Methyl Homologues

had the properties given in a table on p 50. Fig 1 gives the Raman spectra of substances I, III and V (curves a, c and e respectively). Fig 2 gives the infrared absorption spectra of all the six substances studied and Fig 3 gives the corresponding ultraviolet absorption spectra. In all the substances (with the exception of VI) characteristic intense absorption bands appeared in the infrared between 1209 and 1250  $\text{cm}^{-1}$ . The coincidence of certain frequencies and the general similarity of the infrared absorption spectra of thiophene and selenophene and its homologues can be taken as confirmation of the plane structure of selenophene, which belongs to the  $C_{2v}$  type of symmetry. The Raman and the infrared absorption spectra of selenophene agree with the results reported by Gerding et al. (Ref 1). The spectra of selenophene homologues show characteristic frequencies due to vibrations of the substituents (table on pp 46-47). The ultraviolet absorption spectra of selenophene and its homologues obtained in the region 2200-2800 Å did not differ greatly between each other (Fig 3). The ultraviolet spectra of thiophene and its homologues behave in a similar manner. The authors

Card 2/3

SOV/51-6-1-8/30

The Absorption and Raman Spectra of Selenophene and Its Methyl Homologues

suggest that the infrared absorption and the Raman spectra of selenophene and its homologues may be used for identification of these compounds. There are 3 figures, 2 tables and 11 references, 5 of which are Soviet, 3 French, 2 English and 1 Japanese.

SUBMITTED: March 31, 1958

Card 3/3

SOV/51-7-3-4/21

AUTHORS: Kesler, Kh., Pentin, Yu.A., Treshchova, Ye.G. and Tatevskiy, V.M.

TITLE: Investigation of the Infrared Absorption Spectra of Hydrocarbons at Various Temperatures Both in the Liquid and Solid Phases.

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 3, pp 301-310 (USSR)

ABSTRACT: The paper reports a study of the infrared absorption spectra of nine hydrocarbons at temperatures from room temperature (liquid phase) and at low temperatures (solid phase). The study was undertaken to find out the changes in the spectra which occur on solidification. The hydrocarbons studied were normal alkanes (n-heptane, n-octane), branched alkanes (3-methylheptane, 2,3-dimethylheptane, 2,4-dimethylpentane, 2,5-dimethylhexane, 2,2,5,5-tetramethylhexane) and branched alkenes (2-methylheptene-2, 3,3-dimethylheptene-1). All these hydrocarbons were prepared and their properties determined in outside laboratories (acknowledgments are made to Prof. R. Ya. Levina and to A.V. Iogansen in this connection). Table 1 gives the degree of purity, the melting and crystallization points and the refractive index at 20°C ( $n_D^{20}$ ) of the nine hydrocarbons listed above. The infrared spectra were recorded in the region from 700 to 1800  $\text{cm}^{-1}$  by means of a two-beam infrared spectrometer IKS-2 with a NaCl prism. The optical slit width was 7-10  $\text{cm}^{-1}$ .

Card 1/2

SOV/51-7-3-4/21

Investigation of the Infrared Absorption Spectra of Hydrocarbons at Various Temperatures Both in the Liquid and Solid Phases

For liquids, cells with effective layer thickness from 0.03 to 0.48 mm were used. At low temperatures a special cell was employed; its construction ensured the constancy of the layer thickness of a liquid or solid in it. Measurements were carried out at temperatures from +20°C to -172°C. In order to obtain good crystals and to avoid vitrification, the hydrocarbons were cooled slowly. Figs 1-3 show absorption spectra of the nine hydrocarbons at various temperatures. Tables 2-4 give the observed absorption maxima for the liquid and solid phases. The results obtained show that in the case of 2,4-dimethylpentane and 2,5-dimethylhexane only one (the most symmetrical) isomer exists in the crystal phase, but more than one rotational isomer is present in the liquid phase. The authors suggest that only those substances crystallize out which have one rotational isomer of sufficiently high symmetry necessary to form a correct molecular crystal lattice. There are 3 figures, 4 tables and 10 references, 3 of which are Soviet and 7 English.

SUBMITTED: November 26, 1958

Card 2/2

SOV/51-7-4-5/32

AUTHORS: Kuzyakov, Ya.Ya. and Tatevskiy, V.M.

TITLE: Rotational Structure of the (1--1) and (0--1) Bands in the Spectrum of the Carbon Monochloride Molecule

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 4, pp 467-471 (USSR)

ABSTRACT: The spectrum of carbon monochloride (CCl) contains a group of bands in the region 2713-2927 Å; they belong to transitions of the  $2\Sigma^- - 2\Pi$  type. In the existing literature (Refs 1-3) only the vibrational structure of these bands is discussed. The present paper gives the first rotational analysis of two bands in the CCl spectrum and determination of the rotational constants, corresponding to the ground and excited states. The band spectrum of CCl was obtained by means of a diffraction spectrograph DFS-3 (2 Å/mm dispersion in the first order). Only two band sequences ( $\Delta v = 0, +1$ ) are suitable for the rotational analysis. Fig 1 shows the photograph of the bands of the sequence  $\Delta v = 0$ . Fig 2 gives the microphotogram of the  $2\Sigma^- - 2\Pi_{3/2}$  component of the (1--1) band. Values of the line frequencies in various branches and the combination ratios are given in Tables 1 and 2 (all values are in  $\text{cm}^{-1}$ ). The calculated rotational constants were found to be

Card 1/2

SOV/51-7-4-5/32

Rotational Structure of the (1--1) and (0--1) Bands in the Spectrum of the  
Carbon Monochloride Molecule

$B_1'' = 0.6465 \pm 0.0032 \text{ cm}^{-1}$  for the  $2\Pi_{3/2}$  state, and

$B_0' = 0.6589 \pm 0.0038$ ,  $B_1' = 0.6551 \pm 0.0026 \text{ cm}^{-1}$  for the  $2\Sigma$  state.

There are 2 figures, 2 tables and 6 references, 1 of which is Soviet,  
3 English, 1 Indian and 1 translation from English into Russian.

SUBMITTED: February 9, 1959

Card 2/2

AKISHIN, P.A.; NAUMOV, V.A.; TATNEVSKIY, V.M.

Electron diffraction investigation of the structure of molecules  
of vaporous gallium, yttrium, lanthanum, and neodymium halides.  
Vest.Mosk.un.Ser.mat., mekh., astron., fiz., khim. 14 no.1:  
229-236 '59. (MIRA 13:8)

*Chem. Physiol. Chemistry, Moscow State University imeni M.V. Lomonosov, Min. Vses. ed. USSR*  
1. Kafedra fizicheskoy khimii Moskovskogo universiteta.  
(Halides)

5(4),24(5),5(3)

AUTHORS: Tatevskiy, V. M., Papulov, Yu. G.

SOV/20-126-4-37/62

TITLE: Quantum-mechanical Foundation of a Formula for the Energy of Alkane Formation (Kvantovomekhanicheskoye osnovaniye formuly dlya energii obrazovaniya alkanov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 4, pp 823-826 (USSR)

ABSTRACT: For alkanes  $C_nH_{2n+2}$ , which only contain bonds CC and CH the general formula may be derived for the energy of formation from the atoms as follows:

$$E_{C_nH_{2n+2}} = \sum_{CC} R_{CC} + \sum_{CH} R_{CH} + \sum_{CC,CC} R_{CC,CC} + \sum_{CC,CH} R_{CC,CH} +$$

$$+ \sum_{CH,CH} R_{CH,CH} \quad (10).$$

The signs CC and CH in the first two sums denote the summing up of all bonds CC and CH, respectively. The signs CC,CC; CC,CH; CH,CH in the last three sums denote the summing up of all bond pairs CC and CC, CC and CH, CH and CH, respectively. The values  $R_{CC,CC}$  may be divided as follows:

1) Quantities  $R'_{CC,CC}$ , which refer to two CC-bonds possessing

Card 1/4

Quantum-mechanical Foundation of a Formula for the  
Energy of Alkane Formation

SOV/20-126-4-37/62

a common C-atom; 2) Quantities  $R''_{CC,CC}$ , which refer to two  
CC-bonds separated by a CC-bond.  $R_{CC,CH}$  and  $R_{CH,CH}$  may also  
be divided in an analogous way:

$$\begin{aligned} \sum_{CC,CC} R_{CC,CC} &= \sum_{CC,CC} R'_{CC,CC} + \sum_{CC,CC} R''_{CC,CC} + \dots \\ \sum_{CC,CH} R_{CC,CH} &= \sum_{CC,CH} R'_{CC,CH} + \sum_{CC,CH} R''_{CC,CH} + \dots \\ \sum_{CH,CH} R_{CH,CH} &= \sum_{CH,CH} R'_{CH,CH} + \sum_{CH,CH} R''_{CH,CH} + \dots \end{aligned} \quad (11)$$

As a rule, the remaining terms of these equations (11) are  
smaller and may be neglected. On account of quantum-mechanical  
considerations the authors finally derived the following  
equation for the energy of formation  $E_{C_nH_{2n+2}}$  of alkanes from

the atoms:  $E_{C_nH_{2n+2}} = \sum_{i,j=1, i \leq j}^4 n_{ij} B_{ij} \quad (16).$  The derivation

Card 2/4

of this equation is given and discussed in the present paper.

Quantum-mechanical Foundation of a Formula for the  
Energy of Alkane Formation

SOV/20-126-4-37/62

$n_{ij}$  is the number of bonds  $C_i-C_j$  in the alkane;  $B_{ij}$  is a constant and has the following value:

$$B_{ij} = R_{CC} + \left(\frac{4-i}{1} + \frac{4-j}{j}\right)R_{CH} + \left(\frac{i-1}{2} + \frac{j-1}{2}\right)R_{CC,CC} + \left[(4-i) + (4-j)\right]R_{CC,CH} + \left[\left(\frac{3-i}{2}\right)\left(\frac{4-i}{1}\right) + \left(\frac{3-j}{2}\right)\left(\frac{4-j}{j}\right)\right]R_{CH,CH} + \frac{1}{3} \sum_{i,j=1, i \leq j}^4 n_{ij}(i-1)(j-1) \cdot \left[R_{CC,CC}^t + 2R_{CC,CC}^g\right] + \frac{1}{3} \sum_{i,j=1, i \leq j}^4 n_{ij} \left[(i-1)(4-j) + (j-1)(4-i)\right] \cdot \left[R_{CC,CH}^t + 2R_{CH,CH}^g\right] + \frac{1}{3} \sum_{i,j=1, i \leq j}^4 n_{ij} (4-i)(4-j) \left[R_{CH,CH}^t + 2R_{CH,CH}^g\right] +$$

$f_{ij}$  (17), where the quantities  $f_{ij}$ , with the exception of  $f_{22}$ ,  $f_{23}$ , and  $f_{33}$ , are equal to zero.

$$f_{22} = (\alpha_{22} - 1/3) \left[ R_{CC,CC}^t - R_{CC,CC}^g - 2R_{CC,CH}^t + 2R_{CC,CH}^g + R_{CH,CH}^t - R_{CH,CH}^g \right]$$

$$f_{23} = -(\alpha_{23} - 1/3) \left[ R_{CC,CC}^t - R_{CC,CC}^g - 2R_{CC,CH}^t + 2R_{CC,CH}^g + R_{CH,CH}^t - R_{CH,CH}^g \right] \quad (18)$$

Card 3/4

Quantum-mechanical Foundation of a Formula for the  
Energy of Alkane Formation

SOV/20-126-4-37/62

$$f_{33} = (\alpha_{33}^{-1/3}) \left[ R_{CC,CC}^t - R_{CC,CC}^g - 2R_{CC,CH}^t + 2R_{CC,CH}^g + R_{CH,CH}^t - R_{CH,CH}^g \right]$$

Equation (16) is thus analogous to an equation already earlier derived by the authors (Ref 2), in which case they proceeded from the conceptions of the types and forms of bonds CC and CH; the equation is as follows:

$$E_{C_n H_{2n+2}} = \sum_{i,j=1, i \leq j}^4 n_{ij} A_{ij} \quad (19).$$

A certain connection between the constants  $B_{ij}$  was determined. These problems will be dealt with separately. There are 2 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: February 14, 1959, by V. I. Spitsyn, Academician

SUBMITTED: February 10, 1959  
Card 4/4

TATEVSKIY, V.M.

PHASE I BOOK EXPLOITATION

SOV/4043

Tatevskiy, Vladimir Mikhaylovich, Stanislav Semenovich Yarovoy, and Viktor Adol'fovich Benderskiy

Zakonomernosti i metody rascheta fiziko-khimicheskikh svoystv parafinovykh uglevodorodov (Regularities and Calculation Methods of Physicochemical Properties of Paraffin Hydrocarbons). Moscow, Gostoptekhizdat, 1960. 113 p. Errata slip inserted. 2,500 copies printed.

Exec. Ed.: L.A. L'vova; Tech. Ed.: I.G. Fedotova.

**PURPOSE:** This book is intended for synthesis chemists, engineers and scientific workers in the petroleum and petrochemicals industries, and aspirants and students working in the field of motor fuels and the chemistry of hydrocarbons.

**COVERAGE:** The book explains the methods for determining the basic physical and chemical properties of paraffin hydrocarbons (the alkanes), especially the high paraffins, which have been the subject of the most research in the last ten years. These methods make it possible to determine such properties of isomers of the higher hydrocarbons ( $C_{9-15}$ ) as boiling point, density, molecular

Card 1/5

Regularities and Calculation Methods (Cont.)

SOV/4043

volume, molecular refraction, vapor pressure, heat evaporation, heat of combustion, and heat of formation. Tables of computed values of certain physical and chemical properties for the isomeric nonanes, decanes and undecanes are given. The researcher who has learned to use the analytical methods discussed in this book with respect to alkanes will be able to use similar methods for determining the physical and chemical properties of other hydrocarbons: alkenes, alkynes, alkenes, alkylcycloalkanes, and alkylbenzenes as well as other classes of organic compounds. Many properties of the  $C_5-C_{10}$  alkanes and certain properties of the  $C_{11}$  have been determined by the authors. The author mentions

N. Nikitin, V.A. Ziborov, and A.A. Boldin. There are 54 references: 41 Soviet (including one translation), 1 German, and 12 English.

TABLE OF CONTENTS:

Preface	3
Introduction	4
Ch. I. Theoretical Concepts and Experimental Data. First Method of Calculation	10

Card 2/5

Regularities and Calculation Methods (Cont.)

SCV/4043

1. Basic concepts and equations	10
2. Molecular volumes	15
3. Molecular refractions	16
4. Heats of evaporation	17
5. Vapor pressure	20
6. Heats of formation from free atoms, heats of formation from elements, heats of combustion and free energies of formation from elements	23
7. Reaction between alkanes of arbitrary structure	27
8. Calculation of other physical and chemical values (density, boiling point) by the first method	28
9. Certain problems arising in calculating the physical and chemical properties of large numbers of high alkanes by the first method	30
10. Determination of the " $k_1$ families" and " $k_{ij}$ - families" into which alkanes with a given number of carbon atoms decompose	31
11. Certain physical and chemical properties of the $C_{11}$ alkanes calculated by the first method	35

Card 3/5

Regularities and Calculation Methods (Cont.)

SOV/4043

Ch. II. Homologous Regularities in Series of Branched Alkanes. Second Method of Calculating Physicochemical Properties of Alkanes	36
1. Essentials of the method	36
2. Molecular volumes	39
3. Heats of evaporation	40
4. Heats of combustion, thermodynamic potentials and other physicochemical values for alkanes	41
5. Vapor pressure	42
6. Certain special regularities	42
7. Heats of crystallization	43
8. Calculation of other physicochemical values (temperature, boiling point) by the second method	47
Ch. III. Relation Between the Different Physicochemical Properties of Alkanes of Various Homologous Groups. Third Method of Calculation	52
1. Essentials of the method. Relation between two properties of one homologous group of alkanes	52
2. Extension of the method for a case of two different properties, determined under different physical conditions, of two different homologous groups of alkanes	56

Card 4/5

Regularities and Calculation Methods (Cont.)

SOV/4043

3. Application of the third method of calculating other physicochemical properties (density, boiling point)	56
Ch. IV. Comparison of the Three Methods of Calculation	62
1. Comparing the accuracy of the three methods	62
2. Initial data on the properties of alkanes necessary for calculating the properties of high alkanes for each of the three methods of calculation and the overall series of alkanes whose properties it is possible to calculate	66
3. Conclusion	68
Tables 13-25	69
Bibliography	111
AVAILABLE: Library of Congress	

Card 5/5

JA/rem/gap  
8-22-60

TATEVSKIY, V.M., prof., red.; L'VOVA, L.A., vedushchiy red.; MUKHINA,  
E.A., tekhn.red.

[Physicochemical properties of individual hydrocarbons;  
recommended values] Fiziko-khimicheskie svoistva individual'-  
nykh uglevodorodov; rekomenduemye znachenia. Moskva, Gos.  
nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1960.  
412 p. (MIRA 13:12)

(Hydrocarbons)

FROST, Andrey Vladimirovich, prof. [deceased]. Prinimali uchastiye:

BUSEMAKIN, I.N.; VVEDENSKIY, A.A.; GRYAZNOV, V.M.; DEMENT'YEVA,  
M.I.; DINTSES, A.I.; DOBRONRAVOV, R.K.; ZHARKOVA, V.R.; ZHERKO,  
A.V.; IPAT'YEV, V.N.; KVIATKOVSKIY, D.A.; KOROBOK, V.V.; MOOR,  
V.G.; NEMTSOV, M.S.; RAKOVSKIY, A.V.; REMIZ, Ye.K.; RUDKOVSKIY,  
D.M.; RYSAKOV, M.V.; SEREBRYAKOVA, Ye.K.; STEPUKHOVICH, A.D.;  
STRIGALEVA, N.V.; TATEVSKIY, V.M.; TILICHEYEV, M.D.; TRIFEL',  
A.G.; FROST, O.I.; SHILYAYEVA, L.V.; SHCHEKIN, V.V.. DOLGOPOLOV,  
N.M., sostavitel'; GERASIMOV, Ya.I., .otv.red.; SMIRNOVA, I.V., red.;  
TOPCHIYEVA, K.V.; YASTREBOV, V.V., red.; KONDRASHKOVA, S.P., red.  
isd-va; LAZAREVA, L.V., tekhn.red.

[Selected scientific works] Izbrannye nauchnye trudy. Moskva,  
Izd-vo Mosk.univ., 1960. 512 p. (MIRA 13:5)

1. Chlen-korrespondent AN SSSR (for Gerasimov).  
(Chemistry, Physical and theoretical)

80666

S/153/60/003/02/14/034  
B011/B003

5.3100  
5.5310

AUTHORS:

Kuzyakov, Yu. Ya., Tatevskiy, V. M.

TITLE:

Investigation of the Emission Spectrum of a Very Strong  
Electric Discharge Across a Flow of Steam of Carbon  
Tetrachloride

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i  
khimicheskaya tekhnologiya, 1960, Vol. 3, No. 2,  
pp. 293-294

TEXT: The authors used a modified discharge tube by Shyuler (Schueler ?) for the above-mentioned investigation. The electrodes were fed with high voltage from a 220/15,000 volt transformer block. The tube was filled with spectroscopically pure helium. The pressure was 2 - 3 torr. CCl<sub>4</sub> was continuously directed through the tube at 1-2 mm pressure. The emission spectrum was investigated between 1,600 and 10,000 Å. The recordings were made on an apparatus of type DFS-3. Below 2,000 Å, the spectrum was recorded on a vacuum spectrograph of type DFS-5. The

APPROVED FOR RELEASE: 07/16/2001

Card 1/1

Investigation of the Emission Spectrum  
of a Very Strong Electric Discharge  
Across a Flow of Steam of Carbon  
Tetrachloride

80661  
S/153/60/003/02/14/034  
B011/B003

authors obtained the following results: 1. No spectra whatsoever were observed in the vacuum range and in the range of 7,000 - 10,000 Å. 2. In the ultraviolet spectrum range the known groups of intense bands belonging to the  $\text{CCl}$ -molecule were obtained. Furthermore, R. E. Barrow's bands (2,300 Å) were obtained (Ref. 1), which had been ascribed by him to  $\text{CCl}$  or  $\text{CCl}^+$ . 3. In the range of 2,600 Å a continuous background commences which reaches toward the direction of shorter wavelengths, i.e., to about 2,200 Å. 4. In the visible and in the ultraviolet range numerous bands of the  $\text{C}_2$ -molecule were obtained which belong to various transitions. 5. In the 4,050 Å range a band emerges intensely belonging to the  $\text{C}_3$ -molecule. The unclarified band system at 2,300 Å is contrasted toward the direction of greater wavelengths and forms several sequences. The authors used the discharge of another type than that of Barrow and obtained ten bands instead of four, which belong to this system. The latter belongs to the  $\text{CCl}^+$ -molecule. The authors calculated the molecular constants. The dissociation energy  $D_0$  of the ground state of the  $\text{CCl}^+$ -molecule is  $51,700 \text{ cm}^{-1}$ . The

Card 2/4

Investigation of the Emission Spectrum  
of a Very Strong Electric Discharge  
Across a Flow of Steam of Carbon  
Tetrachloride

80856  
S/153/60/003/02/14/034  
B011/B003

authors found that the oscillation analysis by P. Venkateswarlu (Ref. 2) contains contradictions and is unsatisfactory. A new oscillation analysis for the CCl-molecule which excludes the disadvantages mentioned in Ref. 2 (Refs. 3,4) was obtained by the authors from various analogies. They specify the oscillation constants obtained. Doublet cleavage  $\Delta = 118 \text{ cm}^{-1}$ . The authors refer to the table by Deslandres for the Q-edges of the CCl-molecule. The dissociation energy of the ground state of the molecule is  $\sim 4.5 \text{ eV}$  on the strength of the linear extrapolation. Thus 2 band systems were detected in the ultraviolet range of the spectrum mentioned in the title. These systems are ascribed to the molecules CCl and  $\text{CCl}^+$ . The nature of continuous emission between 2,200 - 2,550 Å remained hitherto unclarified. In the discharge of the type used no chlorine bands could be observed. There are 1 table and 4 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova; Kafedra fizicheskoy khimii (Moscow State University imeni M. V. Lomonosov; Chair of Physical Chemistry)

Card 3/4

Investigation of the Emission Spectrum  
of a Very Strong Electric Discharge  
Across a Flow of Steam of Carbon  
Tetrachloride

30666  
S/153/60/003/02/14/034  
B011/B003

SUBMITTED: July 25, 1958

X

Card 4/4

S/051/60/009/002/007/013/XX  
E201/E491

AUTHORS: Kuzyakov, Yu.Ya., Tatevskiy, V.M. and Tunitskiy, L.N.  
TITLE: A Rotational Analysis of Boron Monoxide Bands Lying in  
the Vacuum Ultraviolet Region ✓

PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.2, pp.156-161

TEXT: Chretien (Ref.1) studied the 1300 to 2100 Å spectra of discharges in BF<sub>3</sub> with a vacuum spectrograph fitted with a grating of 1m radius and 8.3 Å/mm dispersion. Chretien found several bands which he ascribed to the BO molecule; the band edges, interpretations and relative intensities are given in Table 1. Later, Zelenskaya and Tunitskiy (Ref.2) reported a discharge spectrum of BF<sub>3</sub> recorded in the vacuum ultraviolet region with a spectrograph AOC-5 (DFS-5) with a resolving power of 120000 and a dispersion of 2.7 Å/mm. Zelenskaya and Tunitskiy wrongly ascribed the bands in the 1700 to 1900 Å region to a hydrogen compound of boron. More detailed studies showed that Chretien's interpretation was correct. In the present paper the authors analyse the fine structure of the (0, 0) and (1, 0) bands (Chretien's nomenclature). A study of the isotopic shift in the BO bands, carried out in the authors' laboratory by A.A.Mal'tsev and V.M.Tatevskiy, showed that Chretien's interpretation should be corrected so that his (0, 0) and

Card 1/2

S/051/60/009/002/007/013/XX  
E201/E491

A Rotational Analysis of Boron Monoxide Bands Lying in the Vacuum  
Ultraviolet Region

(1, 0) bands become (1, 0) and (2, 0) respectively. These two bands lie between 1300 and 2100 Å and are due to  $2\Pi \rightarrow x^2\Sigma$  transitions of the BO molecule; interpretation of the (1, 0) band is given in Table 2 and of the (2, 0) band in Table 3. The rotational constants of the  $2\Pi$  state were also determined (Table 4). There are 4 tables and 7 references: 2 Soviet, 3 English, 1 Swiss and 1 translation from English into Russian. ✓

SUBMITTED: November 23, 1959

Card 2/2

24.6300

AUTHORS:

TITLE:

S/051/60/009/006/004/018  
E201/E191  
Mal'tsev, A.A., Katayev, D.I., and Tatevskiy, V.M.  
An Investigation of the Electronic Spectra and the  
Isotopic Shift of Compounds of Boron and Oxygen. III.  
γ-Bands of the B<sub>2</sub> Molecule  
PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.6, pp 713-720  
TEXT: The electronic spectrum of B<sub>2</sub> has three band systems:  
α-system in the 3100-8500 Å region, β-system in the 2100-3600 Å  
region, and γ-system discovered by Chretien and Miescher (Refs 15,  
16) in the vacuum ultraviolet (1650-1860 Å), due to B<sub>2</sub> impurities  
in discharges in BF<sub>3</sub> mixed with helium. Extending their earlier  
studies (Refs 8,13), the present authors attempt to resolve  
contradictions in interpretation of the B<sub>2</sub> γ-bands by analysing  
the isotopic shift of band edges in samples enriched with B<sup>10</sup>.  
A discharge tube with hot hollow cathode was used to excite the  
spectra of B<sub>2</sub>. A spectrograph DFC-5 (DFS-5) was used to record  
the γ-bands of B<sup>10</sup> and B<sup>11</sup> in the 1600-2090 Å region. The  
wavelengths were found by comparing them with atomic lines of  
boron, silicon and carbon. Fig.1 shows the spectra obtained in

Card 1/2

S/051/60/009/006/004/018

E201/E191

An Investigation of the Electronic Spectra and the Isotopic Shift of Compounds of Boron and Oxygen. III.  $\gamma$ -Bands of the B<sup>10</sup> Molecule

the 1500-2090 Å region for B<sup>11</sup>O (the upper spectrum) and B<sup>10</sup>O (the lower spectrum). Fig.2 shows the 0--3 and 1--4 bands of the  $\gamma$ -system of B<sup>10</sup>O. Tables 2 and 3 list the wave-numbers (in cm<sup>-1</sup>) of the R<sub>2</sub>-branch band edges of B<sup>11</sup>O (Table 2) and B<sup>10</sup>O (Table 3). The molecular potentials of B<sup>10</sup>O are shown in Fig.3. It was found that the  $\gamma$ -system is due to the transition C<sup>2</sup>II--X<sup>2</sup>Σ<sup>+</sup>. A more accurate vibrational analysis of the spectrum was derived from the results and the vibrational constants of B<sup>11</sup>O and B<sup>10</sup>O were deduced (Table 4). A preliminary rotational analysis of five bands was carried out. Correlation between the electron states of B<sup>10</sup>O and the atomic states of B and O was discussed. More accurate wavelengths of the atomic lines of boron and silicon (1360-2090 Å) were obtained; they are listed in Table 1. There are 3 figures, 3 tables and 31 references: 6 Soviet, 13 English, 4 German, 3 Dutch, 1 Swedish, 2 Swiss, 1 Indian, and 1 translation from English into Russian.

✓

SUBMITTED: December 22, 1959  
Card 2/2

KORYAZHKIN, V.A.; TATEVSKIY, V.M.

Applicability of the ionic model to real diatomic molecules. Vest.  
Mosk un. Ser. 2: Khim. 15 no.4:21-22 Jl-Ag '60. (MIRA 13:9)

1. Laboratoriya molekulyarnoy spektroskopii Moskovskogo universiteta.  
(Molecules)

PAPULOV, Yu.G.; TATEVSKIY, V.M.

Energy of formation of a molecule as the sum of the energies of  
paired atomic interactions. Vest. Mosk. un. Ser. 2: Khim. 15 no.5:  
13-18 S-O '60. (MIRA 13:11)

1. Moskovskiy gosudarstvennyy universitet, kafedra fizicheskoy  
khimii.

(Molecules) (Heat of formation)

TATEVSKIY, V.M.; PAPULOV, Yu.G.

Relation between the energy of formation of a molecule from free  
atoms and its structure. Zhur. fiz. khim. 34 no.2:241-258  
F '60. (MIRA 14:7)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.  
(Molecules) (Atoms) (Chemical bonds)

AUTHORS:

Tatevskiy, V. M., Papulov, Yu. G.

S/076/60/034/03/001/038  
B115/B016

TITLE:

Relationship Between the Formation Energy of a Molecule From Free Atoms and Its Structure. II. Energy of the Molecule as the Sum of Energies of the Interactions of Atoms in Pairs (Second Method)

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 3, PP 489 - 504 (USSR)

TEXT: The fundamental concepts and equations for the relationship of the second method mentioned in the title and the fundamental approximate equation on the postulate of which the method is based are given. As a practical example, the formation energy of the alkane  $C_nH_{2n+2}$  molecule is dealt with. The authors point out that equation (1) has no concrete meaning as long as it is not completed by an arbitrarily selected classification of the atom interaction in pairs. It may be seen from the symmetry of the ethane molecule (Fig 1) that all interactions in pairs  $\eta_{HH}$  are exactly equivalent with respects to energy, which does not hold for all interaction in pairs  $\{_{HH}$ . The same also applies to the interactions in pairs of the molecule of the optically active trans-isomer of n-butane (Fig 2). Bernstein's (D) classification, the classification (E), as well as the classification (G) developed by the authors are described, and the equations covering the

Card 1/3

Relationship Between the Formation Energy of a  
Molecule From Free Atoms and Its Structure. II. Energy  
of the Molecule as the Sum of Energies of the Interactions of Atoms in Pairs  
(Second Method)

S/076/60/034/03/001/038  
B115/B016

relationship mentioned in the title are derived. The interactions for various checkerboard configurations of the alkane molecule (Fig 3) as well as the classification of interactions in pairs (D) according to Bernstein are given in table 1. The stable checkerboard configurations of the atoms surrounding the  $C_2 - C_2$ ,  $C_2 - C_3$ , and  $C_3 - C_3$  bonds (the indices 2 and 3 designating in each case a secondary or tertiary carbon atom) are illustrated (Fig 4). The type of the C - C bonds and the position of six atoms surrounding the C - C bond in checkerboard equilibrium configurations are shown in figure 5. Equation (25) corresponds to Bernstein's classification and includes a superfluous constant. The mathematical equations used to calculate the coefficients of this equation by means of the number of different bonds in the alkanes are given in the paper. Classification (E) is defined with additional conditions, and the corresponding equations are derived. Classification (G) of the interactions of atoms in pairs developed by the authors, which is universally applied at present, is derived, and a corresponding equation for the formation energy of the alkane, which is equivalent to the equation given in the first method, is obtained. This classification

Card 2/3

Relationship Between the Formation Energy of a Molecule From Free Atoms and Its Structure. II. Energy of the Molecule as the Sum of Energies of the Interactions of Atoms in Pairs (Second Method) S/076/60/034/03/001/038 B115/B016

is reproduced in table 2. From a comparison between the first and the second method it may be seen that, if a corresponding classification is used, each equation of the second method is mathematically fully equivalent to any equation of the first method with a corresponding classification of the bonds. A relationship can be established between the energy values of different bonds in the first calculation method and the energy values of different atom interactions in the second method. There are 5 figures, 2 tables, and 2 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 16, 1959

Card 3/3

S/076/60/034/04/02/042  
B010/B009

AUTHORS: Tatevskiy, V. M., Papulov, Yu. G.

TITLE: The Relation Between the Formation Energy of Molecules From  
Free Atoms and Their Structure. III

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 4, pp. 708-715

TEXT: This is a discussion of the subject mentioned in the title. By way of introduction, it is pointed out that the attempt by several research workers to represent the formation energy of the molecules as the sum total of the bond energies and the energy of the interaction between the bonds runs counter to the generally accepted concepts of the structure of molecules. On the other hand, the equations derived in this way are not at all new. G. V. Bykov's (Ref. 5) observations on a relation between the bond energy and the "electron charges" of the bonds represent the laws established experimentally in a less acceptable way than do the equations given by the present authors in previous papers. The concept of "electron charges of bonds" given in Ref. 5 is a formal one and remains without foundation. A relation between the number of "effective charges" of the bonds and the bond energies is incompatible with the concepts of quantum

Card 1/2



The Relation Between the Formation Energy  
of Molecules From Free Atoms and Their  
Structure. III

S/076/60/034/04/02/042  
B010/B009

mechanics. It is shown that the equations on the relation between the formation energy and the molecule structure of the alkanes derived according to the method described in a previous paper, are well able to represent the laws involved as well as some physicochemical properties (such as molar volume, molar refraction, heat of vaporization, etc.). These results are easily explained by and founded on the statements (Ref. 6) already made concerning the type and form of the C-C and C-H bonds. There are 26 references, 19 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 16, 1959



Card 2/2